

# Assignment 4

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December 13, 2021

## 1 Introduction

For the 1st part, I removed the theta and phi button of the given cube. Then, I added the pointer lock api for mouse movement and changed theta and phi values according to the mouse movement.

For the 2nd part, I read the obj file given and recorded the vertices and added the matrices(projection, modelview), colors and vertices. Then, according to this datas and drew the monkey head object.

## 2 Experiment

### 2.1 Part 1

For the 1th part, I removed theta and phi buttons and added a pointer lock api instead. I recorded the mouse movement with the Pointer lock api and changed the theta according to x-axis movement of the mouse, and the phi according to the y-axis movement. I deactivated and activated the pointer lock api with "p".

### 2.2 Part 2

For the 2nd part, I took the "monkeyhead.obj" file and read it with JQuery and saved it in the "vertices" array. I saved the vertices array I created in the vertex buffer. I created projection and modelview matrix for the appearance of the object. I called the perspective function for the projection matrix. For the model matrix, I called the lookAt function.

To get the object to rotate on the y-axis counterclockwise, I incremented the theta value continuously and then rotated the model matrix on the y-axis relative to the theta value. And I also used some keys.

+ : When I pressed this key, I increased the increase value of theta. Thus, it turned faster.

- : When I press this key, I decreased the increment value of theta. Thus, it rotates more slowly.

ArrowDown : When I press this key, the camera moves in the negative z-axis direction. It gets closer to the figure. I reduced the z value of the eye.

ArrowUp : When I press this key, the camera moves in the positive z-axis direction. It moves away from the figure. I increased the z value of the eye.

ArrowLeft : When I press this key, the camera moves in the negative x-axis direction. The figure stays on the right. I decreased the x value of the eye.

ArrowRight : When I press this key, the camera moves in the positive x-axis direction. The figure remains on the left. I increased the x value of the eye.

PageUp: When I press this key, the camera moves in the positive y-axis direction. I increased the y value of the eye.

PageDown : When I press this key, the camera moves in the negative y-axis direction. I decreased the y value of the eye.

And finally, I used pointer lock api and activated it with "p". When the mouse moves, x and y position of eye changes accordingly.

Table 1: Classes

Class Name	Attributes	Methods
initialize.js	-	loadShader, initShaderProgram
app.js	vertices, program, canvas, gl, theta, rotateYSpeed, eyeX, eyeY, eyeZ, at, up, movePointer	main, draw, saveObjData, readObjFile, keyPressEvent, keyDownEvent, mouseMovement, changeCallBack, moveCallback, pointerLock
shaders.js	vsSource, fsSource	-
MV.js	-	-
jquery.js	-	-

Table 2: Methods

Method Name	Input(s)	Output(s)	Info
loadShader	gl, typeOfShader, source-OfShader	shader	A new shader is created and compiled.
initShaderProgram	gl, vsSource, fsSource	shaderProgram	It is Calling load shader method for shaders and create Program.
main	-	-	Main function
draw	-	-	It create and calculate matrices and draw monkey head.
saveObjData	-	-	It saves obj files datas to vertices array.
readObjFile	-	-	It reads obj file using jquery.
keyPressEvent	-	-	It checks key press event.
keyDownEvent	-	-	It checks key down event.
mouseMovement	-	-	It is called when mouse moves.
changeCallBack	-	-	It is called when pointer lock api is activated.
moveCallBack	-	-	It saves x and y position of mouse.
changeCallBack	-	-	It is called when pointer lock api is activated.
pointerLock	-	-	It checks when pointer lock api is activated or de-activated.

### 3 Conclusion

In this assignment, unlike other assignments, I learned pointer lock api, load obj files and using of perspective and lookAt functions. I think the most challenging part was the load obj files.

### References

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